

Biological Agent Reference Sheet (BARS)

This content of this document is for Emory University USE ONLY.

The information and contents of this Biological Agent Reference Sheet (including all text and graphics), whether available in print or electronic format (including any digital format, e-mail transmissions, or download from the website), shall be known hereinafter as "Reference Sheet Content". The Reference Sheet Content is provided as a courtesy and is not intended as a sole source of guidance in the evaluation of Biological Agents. The Reference Sheet Content is not intended to substitute for medical advice, medical care, diagnosis or treatment obtained from a physician or health care provider. Please seek the advice of a physician or other qualified health provider with any questions you may have regarding a medical condition. Do not rely on the Reference Sheet Content for diagnosis, treatment, or medical advice. This Reference Sheet Content is for informational purposes and does not provide individualized medical care or treatment. No endorsement of any specific tests, products, or procedures is made by Reference Sheet Content or affiliated party, member, agent or employee of the Emory University Environmental Health and Safety Office.

BIOLOGICAL AGENT REFERENCE SHEET

Powassan Virus (POWV)

CHARACTERISTICS	
<i>Morphology</i>	Flaviviridae; 40-50 nm diameter, enveloped, single stranded RNA.
<i>Growth Conditions</i>	Vero E6 cells (ATCC® CRL-1586™), suckling mouse (i.c. or i.p. inoculation), weaning mouse (i.c. inoculation), or swine kidney cells
<i>Regulatory requirements</i>	Not a Select Agent. Notifiable disease in the United States. USDA/APHIS permit required for shipment.

HEALTH HAZARDS	
<i>Host Range</i>	Humans, woodchuck, snowshoe hare, coyotes, foxes, racoons and skunks, domesticated cats and dogs
<i>Modes of Transmission</i>	POWV spreads to people through the bite of an infected tick. People do not develop high enough levels of the virus in their blood to infect biting ticks. As a result, people are considered “dead-end” hosts for Powassan virus. Importantly, ticks can harbor and transmit one or more pathogens including Borrelia, POWV, Babesia and Ehrlichia/Anaplasma.
<i>Signs and Symptoms</i>	Mostly asymptomatic. Initial symptoms include fever, headache, vomiting, fever. POWV can also cause fatal neuro-invasive disease in the form of encephalitis or meningitis. Approximately 10% of POWV encephalitis cases are fatal.
<i>Infectious Dose</i>	Unknown
<i>Incubation Period</i>	1 week to 1 month

MEDICAL PRECAUTIONS / TREATMENT	
<i>Prophylaxis</i>	None
<i>Vaccines</i>	None
<i>Diagnosis</i>	Healthcare providers diagnose POWV infection based on signs and symptoms and/or history of possible exposure to ticks. Diagnosis is conducted through laboratory testing of blood or spinal fluid. Molecular tests to detect viral RNA (e.g., reverse transcription-polymerase chain reaction [RT-PCR]) can be performed on serum, CSF, and tissue specimens that are collected early in the course of illness and, if positive, can confirm an infection.
<i>Treatment</i>	There is no medication to treat POWV infection.
<i>Surveillance</i>	Serological studies or isolation of virus from blood.
<i>Emory Requirements</i>	Work with POWV must be approved by the Biosafety Office. Report all incidents.

LABORATORY HAZARDS	
<i>Laboratory Acquired Infections</i>	Laboratory-acquired infections (LAI) have been reported including some with serious long-term health problems. LAIs by POWV have been attributed to aerosols from contaminated solutions or animal bedding, accidental parenteral inoculation, or contact with broken skin.
<i>Sources</i>	The source specimens were blood, cerebrospinal fluid, urine or exudates.

SUPPLEMENTAL REFERENCES	
<i>CDC</i>	https://www.cdc.gov/powassan/index.html
<i>Public health Agency of Canada</i>	https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/powassan-encephalitis-virus.html

<i>PubMed</i>	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5512300/
<i>Coppe Labs</i>	http://www.coppelabs.com/wp-content/uploads/Coppe-Powassan-Guide-InPg-July-2016.pdf

CONTAINMENT	
<i>BSL2+</i>	BSL2+ containment is required for handling samples-suspected to be infected with POWV and fixed and unfixed tick samples. Appropriate safety procedures should always be used with these materials. Biosafety containment requirements: BSL2+ means BSL2 containment (restricted access, all work with POWV should be conducted inside the biosafety cabinet) with BSL3 practices and PPE. Lab-specific procedures (SOPs) will outline specific containment and practices and PPE.
<i>BSL3/ABSL3</i>	BSL3/ABSL3 containment is required for propagation of the POWV and or for use in animal models.

SPILL PROCEDURES	
<i>Small</i>	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. An EPA-registered disinfectant should be used to remove contaminating matter from surfaces (e.g., of bench tops and equipment). All decontamination litter and other disposable materials should be autoclaved.
<i>Large</i>	Contact Emory’s Biosafety Officer (404-727-8863), the EHSO Office (404-727-5922), or The Spill Response Team (404-727-2888)

EXPOSURE PROCEDURES	
<i>Mucous membrane</i>	Flush eyes, mouth or nose for 15 minutes at eyewash station.
<i>Other Exposures</i>	Wash area with soap and water for 15 minutes.
<i>Reporting</i>	Immediately report incident to supervisor. Exposures are reported in PeopleSoft https://hrprod.emory.edu > Self-Service > Workplace Health > Log into HOME > Report incident
<i>Medical Follow-up</i>	OIM: 7:30 am- 4pm 404-686-8587 After Hours, Weekends, Holidays: NP On Call: 404-686-5500 PIC# 50464 Yerkes: Maureen Thompson Office (404-727-8012) Cell (404-275-0963)

VIABILITY	
<i>Disinfection</i>	Susceptible to 1% sodium hypochlorite and 70% ethanol
<i>Inactivation</i>	Inactivated by heat (50-60° C for at least 30 min)
<i>Survival Outside Host</i>	Does not survive out of host

PERSONAL PROTECTIVE EQUIPMENT (PPE)	
<i>Minimum PPE Requirements</i>	At minimum, personnel are required to don two pairs of gloves, closed toed shoes, solid front gown, face and eye protection, cover sleeves prior to working with samples. Additional PPE may be required depending on lab specific SOPs.
<i>Additional Precautions</i>	All procedures that may produce aerosols or involve high concentrations or large volumes should be done inside the BSC.